

REGULATED ANTIGEN DELIVERY SYSTEM (RADS)

Abstract of the Invention

We describe a regulated antigen delivery system (RADS) that has (a) a vector that
5 includes (1) a gene encoding a desired gene product operably linked to a control sequence, (2)
an origin of replication conferring vector replication using DNA polymerase III, and (3) an
origin of replication conferring vector replication using DNA polymerase I, where the second
origin of replication is operably linked to a control sequence that is repressible by a repressor.
The RADS microorganism also has a gene encoding a repressor, operably linked to an
10 activatable control sequence. The RADS described provide high levels of the desired gene
product after repression of the high copy number origin of replication is lifted. The RADS
are particularly useful as live bacterial vaccines. Also described is a delayed RADS system,
in which there is a delay before the high copy number origin is expressed after the repression
is lifted. The delayed RADS is also particularly useful for live bacterial vaccines. Also
15 described are several control elements useful for these systems, as well as methods for
providing immunity to a pathogen in a vertebrate immunized with the RADS microorganisms.